

## AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application:

### **Listing of Claims:**

1. (Currently Amended) A pumping system comprising:

- a pumping mechanism;
- a motor for driving the pumping mechanism;
- a drive control for controlling the motor; and
- means for monitoring at least one state within the system;

wherein the drive control causes the system to operate for transient periods in an overload condition and to control the power to the motor when the system is operating in said overload condition dependent on the level of said monitored state so as to avoid said state from exceeding said operational limit[[]],

wherein said drive control includes gain circuitry which can adopt: a gain of 1 thereby not limiting motor power; a gain of zero thereby limiting motor power to zero; and any gain between one and zero, said gain circuitry controlling said gain according to a predetermined relationship with said state.

2. (Previously Presented) The system according to claim 1 wherein the performance is improved by said drive control increasing the power supplied to the motor to a level which can result in said monitored state exceeding a predetermined operational limit.

3. (Previously Presented) The system according to claim 1 wherein the drive control causes the system to operate in an overload condition when a load on the motor requires increased power supply to the motor.

4. (Previously Presented) The system according to claim 1 wherein the drive control does not limit said power unless said state exceeds a predetermined lower limit.

5. (Previously Presented) The system according to claim 4 wherein above said predetermined lower limit, said drive control gradually varies power dependent on said monitored state.

6. (Cancelled)

7. (Previously Presented) The system according to claim 1 wherein the drive control controls the power of the motor by limiting the current supplied to the motor by adjusting the voltage supplied to the motor.

8. (Previously Presented) The system according to claim 7 wherein the drive control comprises programmable means for setting a maximum allowable current in said motor so as to set the extent to which the system can be overloaded.

9. (Previously Presented) The system according to claim 1 wherein said state is a temperature within the system.

10. (Previously Presented) The system according to claim 1 wherein said state is a function of the thermal load of the motor or drive or the pumping mechanism.

11. (Previously Presented) The system according to claim 10 wherein the drive control estimates the motor thermal load according to:

$$\left( \frac{I_{Motor}}{I_{Rated}} \right)^2 \times \frac{1}{1 + s \tau}$$

where:

$I_{motor}$  is the current in the motor;

$I_{rated}$  is a rated current above which said motor is operating in said overload condition;

$\tau$  is a time constant; and

$s$  is the Laplace operator.

12. (Previously Presented) The system according to claim 1 wherein said monitored state within the system is selected from the group of parameters comprising a pressure, a current, a voltage, an impedance, or a temperature.

13. (Previously Presented) The system according to claim 1 wherein the drive control comprises means for receiving input from a sensor for monitoring the at least one state within the system, and when the drive control causes the system to operate for transient

periods in an overload condition, the power to the motor is controlled to avoid the at least one state from exceeding the predetermined operational limit.

14. (Previously Presented) The system according to claim 13 wherein the sensor is for sensing a parameter selected from the group comprising gas pressure, temperature, voltage, or impedance within the system.

15. (Previously Presented) The system according to claim 1 wherein the drive control comprises a variable speed drive for controlling the power to the motor dependent on the level of said monitored state thereby avoiding said state from exceeding said operational limit.

16. (Previously Presented) The system according to claim 1 wherein the drive control comprises analogue means for controlling the power to the motor dependent on the level of said monitored state thereby avoiding said state from exceeding said operational limit.

17. (Previously Presented) The system according to claim 1 wherein the drive control is operable to prevent said system from operating in an overload condition.

18. (Previously Presented) The system according to claim 1 wherein said pumping mechanism is a vacuum pumping mechanism.

19. (Cancelled)